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AUTHOR Chern, Hermine J.; And Others
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ABSTRACT

During March and April of 1986, the three members of the Career Education Evaluation Unit of the Philadelphia (Pennsylvania) School District interviewed 29 automotive mechanics teachers working at nine comprehensive high schools, two vocational technical schools, and two skills centers. The interviews focused on the implementation of standardized curriculum in the automotive shops, equipment and supply availability, and the numbers of students enrolled in automotive mechanics classes. The study also attempted to determine the degree to which three out of five student-oriented outcomes of the Career Education Five-Year-Plan were being addressed. Results indicate time and equipment/supply constraints, favorable responses by teachers to the standardized curriculum, student difficulties in the areas of reading and mathematics comprehension, good attitudes toward staff development sponsored by the private automotive industry, and a lack of sex equity and equal access for the handicapped in program implementation. Enrollment statistics, a list of equipment that teachers considered necessary for implementing standardized curriculum, the interview instrument, and a summary of a June 3, 1986 instructional staff meeting in Philadelphia are appended. (TJH)

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A SURVEY OF AUTOMOTIVE MECHANICS PROGRAMS IN THE PHILADELPHIA PUBLIC SCHOOLS

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Report Number 8701
December, 1986

Office Of Planning, Research And Evaluation
Career Education Evaluation Unit
THE SCHOOL DISTRICT OF PHILADELPHIA

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Executive Director
Office of Career and Vocational Education

Prepared By:
Dr. Hermine J. Chern
Research Associate
Mr. Thomas Bernas
Dr. Leonard Kindler
Research Assistants
Career Education Evaluation Unit
Typed By:
Marguerite Elias-Rice

Dr. Irvin J. Farber
Director
Priority Operations Evaluation Services

Dr. James H. Lytle
Executive Director
Office of Planning, Research and Evaluation

TABLE OF CONTENTS

	Page Number
Acknowledgements	ii
Abstract	iii
Preface	iv
Introduction	1
Curriculum	3
Equipment and Supplies	8
Students	10
Related Topics	15
Relationship of the Study to Student-Oriented Goals Contained in the Five-Year Plan	15
Appendices	
Appendix 1 Student Enrollment in Auto Shop Classes	19
Appendix 2 Teachers' Assessments of Additional or Updated Equipment Needed to Teach the Standardized Curriculum	21
Appendix 3 Instrument Used for Teacher Interviews	24
Appendix 4 Instructional Staff Meeting, June 3, 1986	31

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ABSTRACT

During March and April, 1986, the three members of the Career Education Evaluation Unit interviewed the 29 automotive mechanics teachers who provide training to students at nine comprehensive high schools, two area vocational technical schools, and two skills centers. Teachers were interviewed about the implementation of the standardized curriculum in the automotive shops, about equipment and supplies available to them and about numbers of students currently enrolled in automotive mechanics classes. The study also attempted to determine to what degree the student-oriented outcomes of the Career Education Five Year Plan were being addressed.

Implementation of the standardized curriculum was found to be constrained in most training settings due to inadequate time or equipment. Most instructors responded favorably to the newly-developed curriculum. Although criticizing task sequence and the inclusion of some tasks in the curriculum deemed inappropriate because of technical reasons or the "live shop" nature of the training facilities. Substantial disparities were found in the availability of equipment and supplies, particularly in comprehensive high schools.

Many students experienced difficulties in reading and mathematics comprehension; these handicaps, however, were not found to prevent most of the students from mastering much of the standardized curriculum.

Staff development, sponsored by the private automotive industry, was consistently advocated by the respondents as being one good way of improving training in automotive mechanics. Most of the faculty indicated a need for instruction in and familiarization with newly-developed technology, especially computer-assisted functions and on-board diagnostics.

Of the five specified student-oriented outcomes from the Career Education Five-Year Plan, this study was able to investigate three. The objective of providing competency-based instruction to students, has, for the most part, been achieved. Sex equity in each program, however, was clearly not being met. Female enrollment in the automotive mechanics area was minimal at most sites, except at the area vocational technical schools. The objective of providing access to vocational programs for the handicapped, ESOL and students of both sexes was not fully attained.

A series of specific recommendations conclude the study. Included in the appendices are automotive mechanics enrollment figures at the various training facilities where respondents were interviewed, a list of equipment which teachers consider necessary to implement the standardized curriculum, and a copy of the interview instrument.

PREFACE

This report is the first of two in a comprehensive study of the automotive mechanics curriculum offered in the Philadelphia Public Schools. Its emphasis is upon the degree to which the standardized curriculum has been implemented, and the degree to which equity in each program setting has been assured. The second report, A FOLLOW-UP OF JUNE, 1985 GRADUATES OF THE AUTOMOTIVE MECHANICS CURRICULUM, will provide data concerning the degree to which student-oriented outcomes specified by the Office of Career and Vocational Education in their Five-Year Plan have been achieved. These two reports will provide clear evidence of both the successes and limitations of various programs which are offered by the School District in Automotive Mechanics, and provide a basis for considering changes to enhance both the employment opportunities and opportunities for advancement of auto mechanics graduates.

INTRODUCTION

In September, 1985, each Curriculum Division within the School District of Philadelphia was asked to develop a plan listing its goals and objectives for a five year period. The Division of Career and Vocational Education developed a five-year management plan which, when implemented, would result in five specified student-oriented outcomes:

1. Each secondary and post-secondary student who completes a vocational education program will be able to secure employment, pursue further education, or enter the military.

2. Students will progress through the duties and tasks of Competency Based Vocational Education in a manner which will enable them to be employable at the conclusion of their respective courses of study.

3. Equity for each program will be assured by the installation of standardized equipment, materials, supplies, and sufficient instructional hours to meet minimum program requirements for each vocational area.

4. Access to any appropriate vocational program will be available to handicapped students, ESOL students, and students of both sexes.

5. Pupils will demonstrate career decision-making skills at the awareness, exploratory, and preparation levels.

In order to achieve these goals, the Division of Career and Vocational Education provided each vocational area with a standardized curriculum, to be implemented as of the 1985-86 school year. The Career Education Evaluation Unit of the Office of Planning, Research, and Evaluation was called upon to assist the Division of Career and Vocational Education in assessing all of their vocational and technical programs to help determine their progress in meeting their stated goals.

During this first year of implementation of the standardized curriculum, a determination was made to select one shop area for study. Auto mechanics was selected because a larger number of students was enrolled in this curriculum than in any other curriculum within the trade and industry area. In addition, auto mechanics is taught in many secondary education settings: area vocational technical schools, skills centers, comprehensive high schools, and special schools.

Information to be gathered by this study was determined in consultation with personnel from the Division of Career and Vocational Education, and an instrument to elicit this information was developed. After review by both Research and Career Education personnel, the instrument was pilot tested on two auto mechanics teachers in a vocational school and two in a comprehensive high school. After needed modifications were made, the instrument was considered ready for use.

All auto mechanics teachers within the School District of Philadelphia were interviewed in this study. (In those cases in which a long-term substitute was assigned to the school, the principal made the determination whether information obtained from the substitute would be suitable for the study.) All interviews were conducted during March and April, 1986 by the members of the Career Education Evaluation Unit.

(Note: The auto mechanics course offered at the Catto School, a school for exceptional students, was not included in this study. The shop was temporarily closed at the time of this study, since the regularly-appointed teacher was on sick leave, and an appropriate substitute had not been found.)

CURRICULUM

Background Information

Instruction in automotive mechanics is provided in two types of shops. In one type, called a "live shop", students repair automobiles owned by members of the faculty or other employees of the school district, who bring their cars to one of the schools for repair. In the other type, students learn by disassembling and reassembling automobile engines which have been mounted on stands in a classroom. Over the three year period in which the course is taught, many students will encounter some combination of these two settings, regardless of the type of school in which this curriculum is taught.

Students are scheduled for auto shops according to the type of school they attend. Students who attend area vocational technical schools must be enrolled in the automotive mechanics curriculum for three years, three periods a day, in order to graduate. Students who attend the skills centers attend on an alternate week basis, usually for two years. Consequently, they average about 20 periods per week in the automotive shop over each two-week period. Students who attend the comprehensive high schools must be rostered for at least ten periods per week to the automotive shop to be considered to be attending an "approved" vocational course. For a variety of reasons, however, a student may be enrolled in this course for one, two, or three years, and the number of periods a week may vary.

Introduction

During the 1985-86 school year, the standardized curriculum for automotive mechanics was distributed to all automotive mechanics instructors, and those coordinators and department heads who were responsible for the automotive mechanics area of instruction. The distributed curriculum included a course description, a list of objectives, scope and sequence, task list, and procedures for grading and evaluation. The scope and sequence indicated duties and tasks assigned to each year of instruction. The task sheets which were designed to accompany the curriculum had not yet been delivered to the schools by the time this study was completed.

AREA VOCATIONAL TECHNICAL SCHOOLS (AVTS)

Automotive mechanics is taught in three area vocational technical schools. The two regularly-appointed automotive mechanics instructors at Dobbins were on an extended leave, and the two substitutes at that school were not interviewed. The coordinator at that site, however, did participate in this study. The three instructors at Mastbaum and the three instructors at Bok were interviewed.

Each student in the area vocational technical (AVT) schools is assigned to the automotive shop for three periods a day. It is the practice of the AVTs to give third year students afternoon shop because many of them go to cooperative work experience assignments in the latter part of the third year.

In the AVT schools, the percentage of the year one curriculum which could be taught was estimated by the teachers to be from 50 to 75% of the complete list of tasks. The range for year two was somewhat higher; estimates from 80 to 100% were given. For year three the range was from 50 to 60%. The reasons given by the teachers for the low percentage in year one reflect the design of all area vocational technical schools. The shops are small, they lack some of the equipment which is needed to teach the curriculum, and the first year of instruction. For the third year of the program, specialized equipment needs are even greater, and in most cases, have not been provided to the schools. The instructors also emphasized that the tasks to be covered were too numerous to be taught in one year. Instruction in the electronic control systems was described as being a field in itself, and too involved for students to learn with the time allocated for those tasks.

With one exception, the instructors believed that the standardized curriculum was not appropriate for most of their students. While they believed that the curriculum, if mastered, would adequately prepare students for entry-level employment in the automotive trades, they did not believe that most of the students could read sufficiently well to master the curriculum, especially topics covered during the third year. It was the belief of most of the instructors that the curriculum was designed to meet the needs of all students in all shop settings, and that it would be impossible for each instructor to cover all of the tasks listed.

Major reactions which were expressed regarding the curriculum by persons assigned to the vocational technical schools were:

1. The standardized curriculum provides all of the skills necessary for employment.

2. Significant portions of the curriculum to be taught in years one and two require live car access, and the physical plant at two of the three settings does not permit such access to all shops.

3. Without the delivery of task sheets (which they believed should contain clear illustrations), instructors were hampered; many individuals have been improvising or utilizing the previously released task sheets geared to the V-TECHS manual.

4. Orientation activities in years 1, 2, 3 were considered to be important, but not relevant to the population being taught, and should be reworked.

5. The equipment needed to teach many aspects of the curriculum, especially those topics contained in the third year, is not available in the schools.

6. Teachers who work in a "live" shop setting where cars are brought to the shop for service do not teach the curriculum in the sequence prescribed in the standardized curriculum. Rather, they cover the topics required by the repairs needed on the cars in the shop at that time.

7. In general, the curriculum is too ambitious; some topics were considered specialties. Students showing an interest could be given specialized training in those areas, especially during their senior year.

COMPREHENSIVE HIGH SCHOOLS

Automotive mechanics is taught at 10 comprehensive high schools. Students may be enrolled in the automotive shop one, two, or, in a few cases, three periods per day. (It should be noted that students who are enrolled in the automotive shop for only one period per day, however, are not considered to be enrolled in a vocationally approved program, and are not listed in the Vocational Education Management Information System (VEMIS) file.) Also, students are not necessarily enrolled in a classroom by grade level; students in grades 10, 11, and 12 may be assigned to the same class. Frequently, students who have been assigned to the automotive mechanics curriculum for one, two, or three years will be assigned to the same classroom. The instructor may be teaching 10th grade students who are enrolled for one period per day, and 12th grade students in the same class who remain for three periods. In addition, a twelfth-grade student may be taking automotive mechanics for the first time, and therefore may also be a beginning student.

Many of the fourteen teachers interviewed noted that they could not follow the sequence prescribed by the standardized curriculum because they taught students in a "live" shop, and they had to teach the skills required to service the automobiles that were brought in.

In the comprehensive high schools, the percentage of the curriculum which could be taught during year 1 was estimated by the teachers to be from 50 to 80% of the complete list of tasks. The range for year two was reported to be the same as for year one. One individual indicated

that he would probably cover 90% of the curriculum specified for the third year of the program. Another individual refused to provide an estimate of the percentage of tasks which could be completed for each year of the program, citing the fact that his students were enrolled in a "live" shop. He stated that when students were enrolled in his shop for three years, they learned most of the tasks listed in the standardized curriculum during the three-year period. It would appear that, given the constraints imposed by rostering students to shop for varying numbers of periods, some students do not have the opportunity to learn many of the tasks specified in the standardized curriculum. Unless one examines the roster of an individual over the three-year period, one cannot immediately ascertain the amount of training the student has received, even when the student has been classified as a "completer." Consequently, a prospective employer cannot easily determine the training received by a student, even in the case of "completers."

For the most part, comments regarding the format in which the standardized curriculum is written were divided between making suggestions for moving specific categories of tasks from one grade level to another (for example, engine overhaul activities should be performed in the third year, not the first or second), and commenting that some tasks would be better grouped in larger units (that is, by type of activity, not year; for example, perform tune-ups, repair and replace brakes).

While each instructor indicated his belief that the standardized curriculum was appropriate for entry-level positions in the automotive industry provided the student mastered the curriculum, many individuals believed that some topics contained within the curriculum were too specialized to be taught to high school students.

Major reactions expressed by the instructors in the comprehensive high school settings were:

1. There is too little time to teach all of the tasks included in the standardized curriculum in the time allocated.

2. No shop has all of the equipment which is necessary to teach every topic listed in the standardized curriculum.

3. With the exception of a few topics which many instructors believed were too specialized for inclusion, the standardized curriculum is appropriate for entry-level preparation for automotive mechanics fields. Every instructor commented, however, that the standardized curriculum was written to meet the needs of every student in every automotive shop within the city, and that no one individual could possibly cover every topic which is contained within the curriculum.

4. Some of the orientation activities were considered by many instructors to be inappropriate for their students. One example of this concern was the inclusion of entrepreneurship as a topic to be covered for three consecutive years, since only third-year students could be expected to be able to open their own businesses, and most of them were not likely to do so without much more experience.

5. Those instructors who operate "live shops" do not follow the curriculum on a three-year level basis, but cover topics selectively as they are encountered in the shop.

SKILLS CENTERS

A variety of Automotive Mechanics courses was taught at both Randolph and Swenson Skills Centers. Both instructors were interviewed at the former site, and all six teachers participated in the study at the latter.

Students attend the skills centers at varying periods of time in any given month, depending upon their home school rostering. Students enrolled in the Automotive Mechanics area, nevertheless, devote the entire school day to this one shop on those days on which they are scheduled to attend the skills center. It should be noted that, at Randolph, the two instructors teach the Automotive Mechanics standardized curriculum in a generally sequential manner as one course. At Swenson, on the other land, students attend a "theory" class while being rotated, on a six week basis, through a variety of individual courses within Automotive Mechanics. During the second and third years, the students then specialize in such areas as transmission repair, service station maintenance, and engine rebuilding.

At Randolph, the percentage of the curriculum that the instructors felt could be completed by the end of the present school year was placed at 100%. Swenson instructors' estimates ranged between 50% to 90% for years 1 and 2, and between 70% to 100% for year 3. Generally reasons given for the inability to provide instruction in all of the tasks listed in the standardized curriculum can be categorized into four groups. First, some instructors cited the lack of necessary equipment as being the main reason for their omission. Second, some felt that certain tasks were too inappropriate given the fact that their students gain experience in working on cars by repairing those vehicles brought in by school district personnel. Certain types of repairs included in the curriculum are seldom, if ever, requested. Third, lack of time was offered as a reason for omitting some of the more advanced tasks. Finally, many of the instructors expressed the opinion that the levels of students' skills and interests were such as to render instruction in many of the tasks as impractical or impossible.

Both Randolph respondents felt that the standardized curriculum in Automotive Mechanics was appropriate for most of their students. Three of the Swenson instructors concurred with this opinion, whereas the other

three did not. The latter expressed the belief that, although the curriculum itself was comprehensive, the quality of their students had slipped dramatically in the last two years to such a degree that many of their pupils were not capable of being trained in many of the tasks. Nevertheless, all eight respondents at both sites felt that the curriculum prepared those students who had mastered it for entry-level occupations in the auto mechanics field.

Although some criticism was directed at the sequence of tasks, as well as at the practicality of including some of them in the curriculum due to time and equipment constraints, instructors at both sites rated the standardized curriculum favorably.

EQUIPMENT AND SUPPLIES

AREA VOCATIONAL TECHNICAL SCHOOLS (AVTS)

Because one of the three area vocational technical schools has two substitute instructors, they were not interviewed for this study. However, the coordinator, a specialist in automotive mechanics, was interviewed, and he was able to provide data relevant to this topic. In addition to the coordinator, the three automotive mechanics instructors at Bok and the three automotive mechanics instructors at Mastbaum were interviewed for this study.

Personnel in all three of the area vocational technical schools reported that the equipment in their respective shops bore a close correspondence with what is found in industry. Much of the equipment, however, was in disrepair - about two thirds of it in several shops. When possible, instructors repaired the equipment themselves. When this was impossible, they would notify the coordinator whose responsibility it was to complete the necessary papers, obtain permission from the Office of Career and Vocational Education, and contact individuals who could make these repairs. Some individuals said that this process took from one to three months; one individual said that a request for a repair was rarely fulfilled. One individual stated that some of the equipment in his shop was so old that some parts were no longer available.

Auto mechanics teachers reported that the equipment in their shops corresponded closely to the equipment in a commercial shop, except that certain key pieces of equipment were missing. Items named included: electronic testing equipment, computerized wheel balancing equipment, and other specialized equipment necessary to teach specific parts of the curriculum. In two cases, individuals indicated that the size of the existing shop could not possibly accommodate any additional equipment, regardless of the type.

Since the basic functions of an engine, regardless of age, remain the same over time, students can be taught basic theory regardless of the age of the equipment in the shop. Many changes in the automotive industry, however, have occurred in recent years with which the instructors believe students should be familiar in order to compete for jobs. Consequently, instructors believe that the shops should be equipped with at least a minimum amount of equipment which tests or demonstrates the technology with which the newer cars are built.

In summary, the equipment contained within the AVTSs is, for the most part, adequate to teach the basic curriculum. The shops, however, lack electronic testing and other specialized equipment necessary to complete all phases of the standardized curriculum. In addition, the shops in one of the three schools are considered to be too small to accommodate the necessary equipment.

SKILLS CENTERS

Most of the equipment at Randolph and at Swenson was reported to be in proper working order. At both skills centers, requests for equipment repairs were submitted to Shop Coordinators, with the length of time necessary for the repairs to be completed depending on the type of equipment and the nature of the repair. All but one of the seven respondents felt that their shop equipment conformed to the requirements of the standardized curriculum. All of the instructors felt that additional equipment, however, was necessary. Among specific equipment mentioned was a turbo-charge simulator, a fuel injection simulator, a machine for rod alignment, computerized automotive test equipment and service equipment for front end alignments, parts cleaning solvent tanks, leak detectors for air conditioning instruction, and additional creepers, jack stands, and jacks.

Teachers reported that for the most part they were provided with a sufficient amount of supplies for instructional needs. Some items were considered by some teachers to be in short supply. These included: service kits, overhaul kits, transmission fluid, and Freon gas for air conditioners.

The major conclusion that may be drawn from the above responses is that, although some additional equipment and supplies would be helpful, in general, both skills centers are well equipped and capable of providing instruction in most of the major components of the standardized curriculum in Automotive Mechanics.

COMPREHENSIVE HIGH SCHOOLS

The size of the automotive shop and the equipment contained within the shop varied from school to school to such an extent that generalizations are very difficult to make. An attempt, however, will be made to describe those elements which the schools have in common, and where different, they will be described individually.

The percentage of equipment which was described by the instructors to be in proper working order varied from 5% to 90%. In most cases 80% or more of the equipment was reported to be in proper working order. In some cases, equipment which required repairs was reported to the department head who, in turn, called the Office of Career and Vocational Education for approval to obtain appropriate repair service. Other instructors called the Office of Career and Vocational Education directly to obtain approval. The length of time required for repairs to be made varied from one month or less to one year or longer. Sometimes, as in the case at the area vocational technical schools, the instructors attempted to make the repairs themselves.

Based upon the comments of the instructors, about one third of the shops were very well equipped, one third were moderately well equipped, and one third were very poorly equipped. In those schools which were considered to be very well equipped, only that equipment which addressed the newest technology was not available. This equipment included fuel injection test equipment, four-gas emissions testing equipment, and test equipment for use with computerized automobiles. Schools which were considered to be moderately well equipped lacked such equipment as brake lathes, tire balancers, McPherson strut compressors, and equipment needed to teach cooling systems. Shops which individuals believed to be poorly equipped lacked other equipment such as lifts, shop safety devices, wheel balancers, wheel alignment equipment, and brake lathes.

In addition to the lack of basic equipment necessary to teach the curriculum, a few instructors indicated that they lacked sufficient hand tools for their needs. When asked whether they had sufficient supplies to meet their needs, only two teachers responded in the negative.

Clearly, the shops varied so widely from school to school that generalizations are very difficult to make. One may conclude only that no school has fuel injection and four-gas emissions test equipment. It should also be remembered that the schools vary widely in age, and the physical plant in which the automobile shop is located differs markedly from school to school.

STUDENTS

AREA VOCATIONAL TECHNICAL SCHOOLS (AVTS)

Students are admitted to the AVTS program only after having expressed an interest in attending an AVTS, and after having passed an admission examination for the school of their choice. Auto shop teachers' perceptions of their students' characteristics are, therefore, of considerable interest, and can be compared to the perceptions of teachers in the other two settings included in this study. As previously noted, six auto shop teachers were interviewed at the AVT schools.

Five of the six teachers said that their auto shop students were placed mainly on the basis of self-selection by the students. Only one teacher said that several methods of placement were used, including self-selection, counselor placement, and transfer from other shops because of failure to succeed in another area. That teacher taught only first-year classes in auto mechanics.

Areas with which a large proportion of the students had problems include: measurement, weights, fractions, multiplication, and division. Decimals and use of formulae were also reported to be problem areas for some students.

Although all but one of the six teachers reported that students were having problems with mathematics, none of the teachers thought that their students would not be able to complete the curriculum because they were too deficient in mathematical skills. In no case were the deficiencies thought to be so critical that they would prevent the students from succeeding in that vocational area. Two of the five teachers who had identified students with math deficiencies said that they had referred such students for remedial work in special classes in the school; one teacher said that he had done some remedial work in class with his students.

Four of the teachers said that a number of their students had encountered difficulties in reading. In addition, they reported that, for a few of their students, the difficulties were sufficient to prevent them from completing the curriculum because they could not read the required manuals. Two of the four teachers reported that they had attempted to help such students by verbal explanations in class, and two reported having referred students to remedial reading classes. All of the teachers said that actually to teach reading during class was far too complicated a task, and too time-consuming, for them to undertake. Two of the four teachers indicated that they have on occasion attempted to have such problem readers transferred to other shops.

Only one of the six teachers reported having any students whose difficulties in class could be attributed to the fact that English was not their native language. That teacher, who taught only first-year students, estimated that about 20% of his students had limited proficiency in English.

As would be expected among students who were primarily self-selected for their vocational area, all six of the teachers reported that their students were either "very interested" of "somewhat interested" in the auto mechanics shop work. Four of the teachers reported that their students were "very well behaved: or "moderately well behaved," while two of the teachers described their students as "somewhat disruptive."

Three teachers said that their students were "almost always present." The other three said that their students were "usually present." The percentage of attendance in auto shop was estimated

by the six teachers to be between 80% and 100%, with the average of the six estimates being 87.5%. This agreed well with the six teachers' estimates that less than 20% of their students did not succeed because of poor attendance.

The profile of auto mechanics students that emerges from these interviews indicates that the typical AVTS student is self-selected for auto mechanics; often exhibits deficiencies in mathematics that do not, however, prevent success in the curriculum; exhibits deficiencies in reading that in some cases are sufficient to prevent successful completion of the curriculum. Lack of knowledge of English is not a prevalent problem among these students. In addition, the students are interested in the auto mechanics area, reasonably well behaved, and attend class quite regularly.

COMPREHENSIVE HIGH SCHOOLS

Fourteen auto mechanics teachers at a total of nine comprehensive high schools were interviewed for this report. One of the ten schools where auto mechanics was taught was omitted from the study because the only auto mechanics instructor this year was a substitute teacher who was not licensed to teach auto mechanics.

Eight of the 14 auto mechanics teachers indicated that students were assigned to their shops by a combination of methods: self-selection, roster office placement, counselor placement, or selection by the teacher. Only three of the teachers indicated that the predominant method by which students were placed in auto mechanics was by self-selection. One teacher indicated that "very few" students at his school ever selected auto mechanics on their own. A number of the teachers indicated that pupils failing in other shops had been assigned to auto shop against the pupils' wishes.

All 14 teachers indicated that they had students who had difficulties with various aspects of mathematics. More than half of the teachers reported that a large proportion of their students had difficulties with fractions and measurements, almost half of the teachers reported difficulties with decimals and "basic math." Several teachers reported substantive proportions of students having difficulty with percentages, screw sizes, and the metric system.

Eight of the teachers indicated that they had tried to alleviate some of their students' difficulties in mathematics by teaching the required subject matter during class or during "theory" classes. One teacher mentioned that he planned to start using a computer with remedial math programs during the next school year. Six of the teachers had referred students to various forms of remedial work at the school.

Although all 14 teachers cited some deficiencies in mathematics among their students, only six of them said that they had students who were too deficient in basic mathematical skills to complete the auto mechanics curriculum. Among those six teachers, the percentage of such students was stated to be from 5% to 50% of their enrollment, with the average of the six estimated percentages being 18%.

All 14 teachers also indicated that they had students in their classes who were encountering problems due to difficulties in reading. Two teachers also noted that, although their students could express themselves adequately in spoken English, approximately 45% of them could not express themselves adequately in writing. Several teachers noted that it was very difficult to teach reading during class time, but four teachers reported having prepared simpler text materials, work sheets, or visual aids for use with their problem readers. Eight of the teachers had referred such students for remedial help in reading. One teacher in a school with a large Spanish-speaking enrollment reported using a "buddy system" to help students understand written materials.

Although most students were reported to have problems in reading, only eight teachers reported that they had students who were so deficient in reading that they could not complete the curriculum because they could not utilize the required manuals. Among those eight teachers, the percentages of such students were reported to be from 5% to 12.5% of their enrollment, with an average reported percentage of 10%. Those students, like the others with reading problems, were referred (by three teachers) for remedial help, or were helped by another student (one teacher), or were given simplified text materials (by one teacher).

Only one of the 14 teachers reported having any students who had difficulties because of limited proficiency in English. That teacher was in a school with a large Spanish-speaking population, and about 90% of his enrollment has such difficulties. He had a bilingual aide assigned to the class.

Ten of the teachers reported that their students were "somewhat interested" in the auto mechanics shop, and three reported that their students were "very interested." One teacher reported that his students were evenly divided between the "very interested" and the "very disinterested" categories.

Two teachers reported that their students were "very well behaved," seven said they were "moderately well behaved," and five said that their students were "somewhat disruptive."

Only one teacher reported that his students were "frequently absent," all of the others reporting that their students were either "almost always present," or "usually present." The percentage of students who did not succeed because of poor attendance was reported to be an average of 13% for all 14 teachers. The average attendance rate reported by the teachers was 82%.

From these findings, a fairly consistent picture emerges of the "typical" auto mechanics student at a comprehensive high school. Although only three teachers reported that their students were mainly self-selected for auto shop, most of the students were reported to be interested in the course work, and more than half the teachers reported that their students were at least moderately well behaved. Attendance

patterns varied widely among schools, with very few students failing auto shop because of poor attendance in some schools, to as many as half the students in one teacher's classes. Lack of knowledge of English was not considered to be a problem except at one school, although many students were reported to have difficulties with reading and mathematics, problems which in a significant number of cases were severe enough to be a serious impediment to success in the course work.

SKILLS CENTERS

As was the case in the Curriculum section of this study, there were some differences in the opinions about students between those expressed by the two teachers at Randolph and the six teachers at Swenson.

At Randolph, students interested in enrolling in the Automotive Mechanics area were given a mathematics and reading test devised by the instructors. The instructors thereupon selected 50% of the students based upon their having the highest scores attained on that test. The remaining 50% were rostered into the classes by other means, including student preference, counselor recommendation, and rostering. Student preference, counselor recommendation, and rostering were among the processes used at Swenson to fill the Automotive Mechanics enrollment.

All but one of the teachers at both skills centers reported that a large proportion of their students had deficiencies in the areas of fractions and decimals. Reading deficiencies were also found in a large proportion of the students, but only a small percentage of them had deficiencies so severe that it made their ability to complete the auto mechanics curriculum questionable. No limited English proficiency students were reported in the skills centers.

At Randolph the instructors felt that most of their students were very interested in automotive mechanics, were very well behaved, and were almost always present. The percentage of students not succeeding because of poor attendance was placed at 5%. Usual percentage of shop attendance at Randolph was estimated at 80% to 95%. The Swenson responses to the same questions were more diverse. The same five instructors who felt that most of their students were very interested in automotive mechanics also evaluated most of them as being moderately well behaved in class. One teacher felt that his students were somewhat disinterested in shop activities and were somewhat disruptive when it came to deportment. Four teachers stated that most of their students were almost always present; two replied that most of their pupils were usually present. Asked what percentage of students did not succeed because of poor attendance, the Swenson instructors' responses ranged between 2% and 20%. Usual percentage of attendance in shop classes was estimated by the six instructors as being from 85% to 95%.

Among the conclusions that may be drawn from the above are:

1) Many Automotive Mechanics students demonstrate deficiencies in mathematics, especially in the area of decimals and fractions. As in the case of reading deficiencies, however,

these limitations do not appear to prevent most of the students from succeeding in mastering much of the standardized curriculum.

2) Student interest and attendance in automotive mechanics classes are high at both skills centers.

RELATED TOPICS

In addition to issues regarding curriculum, equipment, and student performance, other questions were asked of coordinators and instructors which were relevant to this study. Because the answers to the questions transcend the structure of each school, the responses will be combined, and not described by type of setting.

When asked to describe the types of information or experiences which would be helpful if staff development or inservice training were to be made available, every individual who was interviewed responded in the same way. In the past, it had been the practice of the School District to arrange for teachers to go to General Motors and the regional Ford Motor Company schools to attend seminars on new equipment and new techniques. Every teacher believed that this practice should be reinstated. It is clear that there have been drastic changes in automobile manufacturing, especially newly-developed computerized technology, and every teacher believed that it is essential to learn about these changes and their effects upon automotive maintenance instruction.

All of the schools either have active craft or advisory committees, or utilize the information provided by a committee which serves another school. While attempts are often made to implement the suggestions which have been provided by members of the craft committees, it is not always possible because of funding constraints. If relevant equipment cannot be purchased, many aspects of automotive maintenance cannot be taught.

At all types of school settings, job placement assistance available to students was provided by coordinators, teachers, and/or job coordinators. Finally, it should be noted that many teachers involved in this study reported that some of their students had been rostered into Automotive Mechanics even though they had not requested that course of study.

RELATIONSHIP OF THE STUDY TO STUDENT-ORIENTED GOALS CONTAINED IN THE FIVE-YEAR PLAN

In the section which follows, the results of this study will be examined in the context of the five student-oriented outcomes specified in the Division of Career and Vocational Education Five-Year Plan (see the Introduction section of this report).

First, it is the goal of the Division that each student who completes a secondary and post-secondary program will be able to secure employment, pursue further education, or enter the military. (Two post-secondary programs at the John F. Kennedy Center have been established to address the needs of the post-secondary population. Because they operate on a totally different basis than the secondary schools, they are not included in the results of this study).

This goal will be addressed by a follow up study of automotive shop graduates which will be published in the near future. In addressing this goal is must be noted that many students enrolled in automotive mechanics classes in the comprehensive high schools may not qualify officially as being enrolled in the automotive mechanics curriculum because they do not attend class for a sufficient number of periods. It is considered by the teachers of these classes to be impossible for these students to complete the standardized curriculum in the time provided. Consequently, should these students consider themselves to be taking a course in automotive mechanics as an elective, and purely for information for their own use, no problem exists. If these students, however, elect to pursue automotive mechanics as a career objective, steps should be taken to ensure that the schools provide a sufficient number of periods for them to obtain the skills necessary to fulfill such a career objective, or they should be advised to transfer to a different type of training facility. Should neither alternative be acceptable to them, they must receive career counseling to recognize that additional training at some future date will be necessary. The main point is that they should not be permitted to harbor the illusion that they will leave high school prepared to be entry level auto mechanics.

The second objective of the Division is to provide competency based education to the students who are enrolled in this curriculum. For the most part, this objective is being achieved. In the opinion of the instructors interviewed, students who, in fact, master the standardized curriculum in automotive mechanics are employable. A recurring problem, however, exists in the case of those students who, lacking reading and mathematics skills, and/or adequate motivation, complete the course in automotive mechanics in spite of lacking the skills necessary for employability. This would suggest the need for several alternatives. First, students should not be involuntarily rostered into automotive mechanics. Secondly, those students having the motivation and interest to succeed, but lacking the necessary reading and mathematics skills, should be provided with tutoring that may enable them to succeed. Schools need to consider whether students should be permitted to graduate if they do not have the necessary skills.

The third objective, equity for each program, is clearly not being met. Very few students who are enrolled in the automotive mechanics curriculum in the comprehensive high school have the opportunity to receive training on the types and quality of equipment which is to be found in the skills centers. Even at the AVTs, while the quantity of equipment may be greater, smaller shops and the age of the equipment

seriously compromise this advantage. In accordance with the Vocational Education Management Information System guidelines, students in comprehensive high schools who are enrolled in a two-period per day automotive mechanics course do not meet state guidelines; provisions should be made for the addition of an extra period of instruction. In those schools where improved equipment and/or increase in instructional time cannot be guaranteed, automotive courses should be terminated.

The fourth objective, access to an appropriate vocational program by handicapped, ESOL, and students of both sexes, requires discussion. There is evidence that handicapped students are enrolled in automotive mechanics curricula in some locations, and are given instruction in those competencies which are believed to be appropriate by their respective teachers. ESOL students are enrolled in large numbers at one comprehensive high school and at a skills center where automotive mechanics is being taught. An after-school program at one of the skills centers was developed to assist those students who were interested in automotive mechanics, and whose facility with the English language was not adequate to enable them to be enrolled in a regular program. Although the numbers of female students who are enrolled in automotive mechanics are small, except in the AVTs where the numbers are substantial, no evidence exists that female students are being formally denied access to training in automotive mechanics. It may be that women are not being encouraged to enroll in this course. Perhaps additional career information in non-traditional occupations should be conducted to inform women about career opportunities in the automotive mechanics field.

Last, the goal that students will demonstrate career decision-making skills at the awareness, exploratory, and preparation levels is being addressed to some degree. At the AVT schools, students have the opportunity to be enrolled in automotive mechanics for a six-week period to determine whether this curriculum is of interest to them. Also contained within the standardized curriculum are certain tasks designed to enhance career awareness. No determination has been made as to whether these tasks are being taught and/or mastered at all sites.

This study did not address the subject of career awareness at the elementary and middle schools levels.

CONCLUSIONS AND RECOMMENDATIONS

Some of the information which has been presented in this report is of a general nature, and further examination of each shop is desirable. However, some recommendations can be made which will address many of the concerns that have been raised.

1. A substantial number of teachers in all three settings made the suggestion that the standardized curriculum be reviewed on an ongoing basis. They suggested that it be reviewed by members of the business community, and that teachers should have the opportunity to meet as a group to make comments and suggestions based upon their experiences in the classroom.

Such a meeting was, in fact, held on June 3, 1986 at Dobbins Area Vocational Technical School, a summary of which will be found in Appendix 4. They felt that future meetings should include representatives of private industry.

2. It has become apparent that additional staff development is needed to implement the standardized curriculum. Some instructors, especially those who are responsible for teaching students in a live shop setting, have had too little guidance in the use of the curriculum. Some individuals believed that all of the standardized curriculum must be taught to every student; others believed that instruction in all topics was unrealistic. For these and other reasons, more staff development is necessary.

3. Additional instruction in computerized technology is essential for all automobile mechanics instructors. Perhaps schools which have been established by General Motors and the Ford Motor Company could be utilized for such purposes, as they have been in the past for other topics.

4. For handicapped students who are mainstreamed into the automotive mechanics curriculum, some job opportunities are available among the large numbers of job titles in the automotive field. The competencies which these handicapped students have achieved can be described on an individualized basis, and the goal to achieve equal access for appropriate vocational programs for these students can be achieved.

5. If instruction is to continue to be given in "live shops", additional training must be provided in those areas in which "outside work" is not forthcoming. While there are many options possible to provide this instruction, students who elect automotive mechanics as a career choice must be assured a comprehensive program.

6. It was found that there are a large number of shops in which equipment needed to teach the standardized curriculum is not available. Almost all of the comprehensive high schools and AVTs lack adequate computerized diagnostic equipment, and no school has four-gas emissions testing equipment. Ways will have to be found to ensure that all students who elect the automotive mechanics curriculum have access to all of the equipment which is needed to learn the curriculum. If shops lack the necessary equipment to teach some topics in the standardized curriculum, either they must be supplied with the necessary equipment or the shop should be closed, since it is not capable of fulfilling its instructional mission.

7. Remediation in language and mathematics skills should continue to be a high priority.

8. Students should not be involuntarily rostered into automotive mechanics courses.

9. Students should be rostered to automotive mechanics classes for a sufficient number of periods to receive the instruction necessary to attain entry-level competence and to meet the number of hours per week mandated by state law.

APPENDIX 1

Student Enrollment in Auto Shop Classes

Student enrollments listed for the Comprehensive High Schools and the Area Vocational Technical Schools do not include all students in the city who were enrolled in auto mechanics classes. This is because the figures listed were provided by the teachers who were interviewed, and substitute auto mechanics instructors were not included in the study.

COMPREHENSIVE HIGH SCHOOLS

School	Teacher	No. of Classes	Enrollment M	F	Total	Average Class Size
Bartram	A	3	62	0	62	20.7
	B	5	105	3	108	21.6
Edison	A	2	60	4	64	32.0
Ben Franklin	A	3	49	0	49	16.3
	B	3	42	0	42	14.0
Gratz	A	1	20	0	20	20.0
	B	3	42	1	43	14.3
Lincoln	A	5	108	1	109	21.8
	B	2	48	0	48	24.0
Olney	A	3	59	0	59	19.7
Roxborough	A	2	40	2	42	21.0
Washington	A	6	93	2	95	15.8
West Phila.	A	1	36	1	37	37.0
	B	1	29	1	30	30.0
Totals:		40	793 (98.1%)	15 (1.9%)	808	20.2

AREA VOCATIONAL TECHNICAL SCHOOLS

School	Teacher	No. of Classes	Enrollment M	F	Total	Average Class Size
Bok	A	2	28	2	30	15.0
	B	2	26	11	37	18.5
	C	2	25	0	25	12.5
Mastbaum	A	2	27	11	38	19.0
	B	2	29	8	37	18.5
	C	2	33	5	38	19.0
Totals:		12	168 (82.0%)	37 (18.0%)	205	17.1

SKILLS CENTERS

Due to the special nature of student scheduling at the skills centers (i.e., students rotate between their home schools and the skills centers on a bi-weekly basis), the enrollments reported by the teachers who participated in this report must be studied with care when compared with enrollments in Automotive Mechanics at comprehensive high schools and area vocational technical schools. As is the case with all skills center teachers, none of their pupils are scheduled to attend class every day. In any given two-week period, for instance, a class whose total enrollment is 30 may have 20 pupils assigned to attend one week, but only 10 students the following week. The following figures, therefore, do not represent scheduled enrollments on a daily basis, only total enrollments on a bi-weekly basis.

Skills Center	Teacher	Enrollment M	F	Total
Randolph	A	30	0	30
	B	19	0	19
Swenson	A	*	*	*
	B	21	0	21
	C	48	0	48
	D	35	1	36
	E	20	0	20
	F	35	1	36
Totals:		208 (99.0%)	2 (1.0%)	210

*This teacher's total class enrollment consisted of students drawn from other instructors' classes, who received two hours of instruction in Automotive Theory per week.

APPENDIX 2

Teachers' Assessments of Additional or Updated Equipment Needed to Teach the Standardized Curriculum

RANDOLPH

Computer and fuel injector simulators

SWENSON

Simulators for turbo-charger and fuel injector
Front-end alignment machine
Computerized test equipment and service equipment
Additional lift
Parts cleaning solvent tanks
Leak detectors for air conditioners
Creepers, jack stands, jacks

BARTRAM

Valve guide reconditioning equipment
Hot tank for parts cleaning
Front end alignment machine
Lathe
Wheel balancer

EDISON

Alignment rack
More lifts
Spin balancer
Updated (computerized) electronics and test equipment

BEN FRANKLIN

Front end machine
Modern electronic diagnostic machines
Disk brake equipment
Cooling system equipment
Lift for chassis lubrication

GRATZ

Emission analyzer
Diagnostic equipment for car computers
Wheel balancing equipment
Fuel injection test equipment
Testers for electronic systems
Automatic transmission equipment

LINCOLN

Updated version of wheel balancing equipment
Test equipment

OLNEY

Four-gas emissions tester
Fuel injection test equipment
Car computer test equipment
Test equipment for electronic systems
Front-end machine

OVERBROOK

Teachers at Overbrook High School were not interviewed, because there was no regularly appointed auto mechanics teacher at the school this year.

ROXBOROUGH

Brake lathe
Electronic engine analyzer
Front wheel alignment equipment
Wheel balancer
Light tester
Hand tools
Small shop equipment

WASHINGTON

Brake lathe
Engine analyzer
Test equipment for electronic circuitry
Tire changer
Tire balancer
McPherson strut compressor

WEST PHILADELPHIA

Creepers
Exhaust vent system
Battery charging equipment
Tire changing equipment
Wheel balancer
Front end alignment machine
Hand tools
Test instruments
Shop safety devices
Safety stands
Power tools
Audiovisual equipment
Manuals and textbooks
Expendable supplies

BOK

Needs larger shop to hold required equipment
Front end machine
Heater repair equipment
Computer wheel balancer
Computerized engine analyzer
Jacks
Engine stands
Later model engines
Emission control testers
Emission engine and electrical systems simulator
Hand tools
Power tools
Brake lathe
Modern electronic equipment

DOBBINS

Teachers at Dobbins were not interviewed, because there was no regularly appointed auto mechanics teacher at the school this year.

MASTBAUM

Needs larger shop
Axle bearing puller equipment
Tools for working on differentials
New alignment rack

APPENDIX 3

INSTRUMENT USED FOR TEACHER INTERVIEWS

SURVEY OF AUTO MECHANICS

INTERVIEW FORM - TEACHERS

NAME OF SCHOOL_____ NAME OF TEACHER_____
DATE OF INTERVIEW_____ LIVE SHOP? Y____ N____
IF YES, DO STUDENTS WORK ON CLIENTS' CARS? Y____ N____

TYPE OF SCHOOL

SKILLS CENTER ____
COMPREHENSIVE ____
AVT ____
SPECIAL ____

NUMBER ON ROLL IN EACH CLASS

	M	F		M	F
1	____	____	5	____	____
2	____	____	6	____	____
3	____	____	7	____	____
4	____	____			

CURRICULUM TITLE_____

1. According to your present schedule, how much of the standardized curriculum do you estimate you will be able to complete by the end of the school year?

   Yr. 1 ____%
   Yr. 2 ____%
   Yr. 3 ____%

2. How much of the standardized curriculum guide do you expect to be usable for instruction?

   Yr. 1 ____%
   Yr. 2 ____%
   Yr. 3 ____%

   If less than 100%, why? (ask for each year; be sure to determine whether problem is lack of equipment or too much to cover in one year)_____

3. Does the standardized curriculum differ from the one you were using prior to this year? Yes____
   No____

   If yes, in what ways does it differ?

4. Do you believe that the standardized curriculum is appropriate for most of your students? If not, why not? Yes_____ No_____

5. What changes, if any, would you recommend in the Standardized Curriculum for your shop? (separate by year of program)

6. In your judgment will the standardized curriculum, as written, adequately prepare those students who have mastered it for entry-level occupations in the auto mechanics field? Yes_____ No_____

(discuss)

7. To the extent possible at this time, please indicate whether you think you will be able to cover the topics included in the curriculum over the three-year period. If "no" what topics will you not be able to cover?
Yr. 1 Yes ____ No ____
Yr. 2 Yes ____ No ____
Yr. 3 Yes ____ No ____

(separate by year)

8. How well does the standardized curriculum provide the following?

a. instruction in all of the skills necessary for employment
very well____ acceptably ____ not at all ____

b. inclusion of activities (task sheets) to teach the skills referred to in (a.)
very well____ acceptably ____ not at all ____
did not receive _____

c. assessment techniques to measure student acquisition of skills
very well____ acceptably ____ not at all ____
did not receive _____

d. topics suitable for students with above or below average ability as compared with the rest of the students in the class
very well____ acceptably ____ not at all ____

STUDENTS

9. In what manner are students placed in your shop? (purely self selection vs. counselor or roster placement, your selection, combination, other)

_____
_____
_____
_____
_____

10. What, if any, deficiencies in mathematics do your students demonstrate?
(type) a. _____ _____%
b. _____ _____%
c. _____ _____%

_____
_____
_____

11. What steps are being taken to remedy the deficiency/ies mentioned above?

_____
_____
_____

12. Are there any students in your classes whom you believe cannot complete the curriculum because they are too deficient in basic mathematical skills? Yes _____
No _____
If yes, estimate percentage _____%

_____
_____
_____

13. If this has been a problem, how have you attempted to deal with it?

_____
_____
_____
_____

14. How many, if any, of your students are encountering problems in your classroom due to difficulties in reading?
(estimate percentage) _____%

15. What steps are being taken to remedy these difficulties?

_____
_____
_____
_____

16. Are there any students in your classes whom you believe cannot complete the curriculum because they are too deficient in reading to utilize the required manuals? Yes _____
No _____
If yes, estimate percentage _____%

17. If this has been a problem, how have you attempted to deal with it?

_____
_____
_____

18. Are there any students in your classes having difficulties because they have limited proficiency in English? Yes _____
No _____
If yes, estimate percentage _____%

19. Which of the following best describes the level of interest of most of the students in your shop?
a. very interested
b. somewhat interested
c. somewhat disinterested
d. very disinterested 19. _____

20. Which of the following best describes the behavior of most of the students in your shop?
a. very well behaved
b. moderately well behaved
c. somewhat disruptive
d. very disruptive 20. _____

21. Which of the following best describes the attendance of most of the students in your shop?
a. almost always present
b. usually present
c. frequently absent
d. almost always absent 21. _____

22. What percentage of your students do not succeed because of poor attendance? 22. _____

23. What is the usual percentage of attendance in each of your shop classes? 23. _____

EQUIPMENT AND SUPPLIES

24. What percentage of the equipment in your shop is usually in proper working order? 24. _____

25. When the equipment is in disrepair, what procedures do you follow to have repairs made?

_____

_____

_____

_____

_____

26. When the equipment is in disrepair, how long does it usually take for repairs to be made?

_____

_____

_____

_____

27. To what extent does the equipment in your shop conform to the requirements of the standardized curriculum? Discuss

_____

_____

_____

_____

28. What additional equipment do you need to be able to implement the standardized curriculum?

_____

_____

_____

_____

29. To what degree do you believe the equipment in your shop reflects what is found in industry?

a. very close correspondence
b. somewhat close
c. moderately dissimilar
d. very dissimilar

29. _____

30. Do you believe your shop lacks specific equipment necessary to prepare students to meet industry standards? Yes _____
No _____

If you answered yes, please name the item/s which you believe needs to be purchased.

_____
_____
_____
_____

31. Are you provided with a sufficient amount of supplies for your instructional needs? Yes _____
No _____

If no, please indicate which supplies you need.

_____
_____
_____
_____

MISCELLANEOUS

32. What services, if any, are available for placing students in part time or full time employment?

_____
_____
_____

33. If staff development or inservice training were to be made available, what types of information or experiences do you believe would be helpful to you?

_____
_____
_____

34. What happens to the recommendations of the auto mechanics craft committee?

_____
_____
_____
_____

35. What percentage of the orientation activities contained within the standardized curriculum have you been able to offer your students?

Yr. 1 _____%
Yr. 2 _____%
Yr. 3 _____%

36. How are your auto mechanics classes organized? (several levels within one class or yr. 1; yr. 2; yr. 3 separated in some fashion)

_____
_____
_____

37. If you can think of any other issues which have not been covered, or any comments you have regarding any aspect of auto mechanics instruction, we would appreciate them.

_____

_____

_____

_____

_____

_____

_____

THANK YOU.

APPENDIX 4

INSTRUCTIONAL STAFF MEETING, JUNE 3, 1986

On June 3, 1986, all instructional staff met as selected sites throughout the city to discuss the standardized curriculum and the related pacing schedules. All instructors of automotive mechanics throughout the city met at Dobbins Area Vocational Technical School to discuss these issues.

The individuals were divided into three groups, thus enabling each individual to have a greater opportunity to make a contribution and participate in the decision-making process. Since many of the comments and recommendations were similar among the three groups, they will be combined and presented in one list.

1. During the first year of the curriculum, students should not work on "live" cars. Emphasis should be placed upon the fundamentals of the automobile, and such related issues as tool identification, measurement, and safety. Also, not enough theory is included in the program at all levels.

2. Changing technology has significantly increased the need for emphasis upon electronics systems utilized in the automobile. A strong emphasis must be given to basic automotive electricity as it pertains to electronic ignition and computer control systems.

3. A driver education program should be implemented within the school system. Students should be encouraged to obtain a driver's license by their senior year to make them more employable. (An individual can not be employed as an automobile mechanic without a driver's license).

4. Students should be given preparation for safety inspection and emission inspection licensing. This would require the purchase of equipment necessary to carry out these inspections.

5. Instructors must be given the opportunity to receive training to learn about the rapidly changing automotive technology. The School District should make appropriate arrangements with automobile manufacturers to enable the faculty to gain access to their respective educational facilities.

6. Obsolete equipment should be replaced with equipment mandated by the standardized curriculum. A checklist should be made to determine whether equipment is available for every objective listed in the standardized curriculum. A determination can then be made whether to purchase the equipment necessary to teach that objective, or to eliminate the objective from the curriculum.

7. Guidelines should be provided for grading students with special needs. Instructors who teach students with special needs should be given more information about those students.

8. Teachers should have input and must review questions to be used in the standardized tests. The number of different textbooks utilized throughout the city should be minimized. Standardized tests should be given for the "basics" (e.g., brakes).

9. Teachers should have flexibility. They believe it is very difficult to maintain pacing in the shop areas, because of the variety of shop equipment and the diversity of tasks to be taught, especially in "live" shops.

10. Many of the orientation activities listed for the first year are not appropriate. Entrepreneurship should be covered only in the third year.

11. Tasks sheets should be distributed as quickly as possible. A different set of task sheets should be provided for "mainstreamed" students.